

Using Hospital Sales Prices to Test Nonprofit Efficiency

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Abstract: While the theoretical literature hypothesizes that nonprofit hospitals are less efficient than for-profits, empirical cost comparisons have been confounded by difficult to measure controls like quality. We bypass this problem by comparing hospital market values measured by sales prices. We ask whether the market for corporate control views nonprofits as less efficient than for-profits? We also address concerns that nonprofit hospitals sell to for-profit chains at “too low” a price. We find that the market for hospitals is competitive and therefore nonprofit hospitals are not sold at “too low” a price, and that the values nonprofits as efficiently as for-profits.

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Private nonprofit organizations are significant players in the arts, education, medical care, and others sectors. These organizations are given significant tax breaks because they thought to offer something that for-profit organizations do not. While there is substantial debate over what nonprofits actually maximize, there is a common concern that private nonprofit organizations are less efficient than their for-profit competitors¹. Analogously, there is a similar efficiency concern about state owned enterprises that has driven the privatization tidal wave throughout the world over the last twenty years (Shleifer and Vishny, 1994; Shleifer, 1998).

Recent theoretical work, however, is challenging the widely-held notion that nonprofits are necessarily inefficient. Glaeser (2001) suggests that a competitive market can discipline nonprofit management. Kuan (2001) argues that nonprofits are efficient when consumers organize around private information to produce a good for their own consumption, a sort of “consumer cooperative.”

In this paper we examine whether private nonprofit and government hospitals are less efficient than for-profit hospitals. To date, the empirical research has focused mainly on managerial slack by comparing cost differences between nonprofits and for-profits. However, hospital costs studies have not been able to control for unobserved quality, making it impossible to distinguish higher costs from higher quality (Sloan, 2000 p. 1155).

Instead, we ask whether the market for corporate control views nonprofit and government hospitals as less efficient than for-profits? If a buyer believes that it can improve a nonprofit’s efficiency by changing its management and thereby improve

¹ See Sloan (2000) for a review of this literature as applied to the hospital industry.

financial performance, then it would pay a higher price than it would for similarly performing for-profit.

Using data from 135 recent hospital sales, we compare the market value as measured by Tobin's q -- sales price divided by assets-- of nonprofit, government hospital, and for-profit hospitals, controlling for the firm's financial position. We find that for-profit buyers pay the same price for nonprofit and government hospitals as they do for for-profit hospitals controlling for financial performance. We also find that nonprofits behave like efficient buyers in the market, not over-paying for for-profits.

Examining hospital sales prices allows us to address another worrisome policy question. Recently, a large number of nonprofit hospitals have "converted" to for-profit, either by management buy-out or by sale to a for-profit chain.² Since the proceeds of the sale of a nonprofit are placed in a public trust, policy makers have raised the question of whether the sales price is too low (Lutz, 1996; Sloan et al, 2000). A "too low" price might occur in an uncompetitive market, where a nonprofit hospital might receive only one low bid and the nonprofits would fail to reject that bid because of inexperienced management³. We find no evidence that nonprofits are sold to for-profits for too-low a price.

However, we do find that nonprofits and government sellers exhibit an important difference from for-profits; they offer nonprofits a price discount. More specifically, religious nonprofits sellers offer other religious nonprofit buyers a discount, and nonreligious nonprofit sellers offer both religious and nonreligious nonprofit buyers a

² Between 1980 and 1995, 263 nonprofit hospitals converted to for-profit (Cutler, 2000, p. 1).

³ Sloan et al (2000) fail to find "too low" prices in a set of case studies.

discount. This is consistent with the notion that nonprofits and government sellers discount to buyers with similar objectives.

I. THE LITERATURE

Theoretical reasons for why nonprofits exist vary, but most theories have agreed that nonprofits are less efficient than for-profits. The many sources of nonprofit inefficiency described in the theoretical literature fall into two categories: technical and allocative. A firm with technical inefficiency operates inside the efficient frontier, while a firm with allocative inefficiency operates on the efficient frontier but not at the profit-maximizing point.

Technical inefficiency can arise when the nonprofit firm's governance or objectives deviate from the more efficient for-profit firm's. This might occur as a result of ill-defined ownership. For example, nonprofits are thought to lack owners altogether (Hansmann, 1998, Becker and Sloan, 1983); or have diffuse owners, such as the community (Sloan et al, 2000) or physicians (Pauly and Redisch, 1973). The weakened governance of ill-defined nonprofit ownership contrasts with the more efficient governance of for-profits, whose clearly defined owners share the same profit-maximizing objective. Another potential source of technical inefficiency may come from tax breaks and philanthropy that weaken managerial incentives (Lakdawalla and Philipson, 1998). The literature on state-owned firms similarly hypothesizes that inefficiency arises because of weak incentives, poorly defined ownership, and political capture (Shleifer, 1998).

Allocative inefficiency could occur if the nonprofit maximizes something other than profits, such as quantity (Steinberg, 1986), quality (Smith, Clement, and Wheeler, 1995) or both (Newhouse, 1970). In the case of hospitals, one of the most popular ideas about nonprofits is that they exist to serve the poor rather than shareholders (Frank and Salkever, 1991; Norton and Staiger, 1994; Thorpe and Phelps, 1991). A nonprofit with such objectives is expected to “overproduce” quality or quantity, compared with the efficient for-profit.

Not all of the theoretical literature on nonprofits claims that nonprofits are inefficient, however. Recent work on the performing arts (Kuan, 2001a) and open source software (Kuan, 2001b) suggests that nonprofits are not only efficient, but can achieve greater total surplus than for-profits. In these analyses, nonprofits form when consumers organize around some private information to produce a good they wish to consume or use. The resulting objective function is an efficient, aggregated utility function, rather like a profit function. Kuan’s model applies to hospitals, if one views the consumers (users) of hospital services as physicians.

Another reason nonprofits might be efficient is competition (Glaeser, 2001). Particularly in the hospital market, in which nonprofits, for-profits, and government hospitals often compete in the same local market, competition could discipline otherwise slack management.

Numerous empirical studies have sought evidence of nonprofit technical inefficiency by comparing nonprofit and for-profit hospital costs. These cost studies have employed various methods for comparing nonprofit and for-profit costs, including accounting measures of cost per case, comparisons of hospital pairs, and cost function

regression analysis. The results have been all over the map as some of these studies have found that nonprofits are more costly than for-profits, others have found them to be less costly than for-profits, and a third group found them to as costly as for-profits.⁴ Few if any studies have attempted to estimate allocative inefficiency, although some have asked whether nonprofits produce a different mix of outputs.

The difficulty in measuring quality of care and patient severity of illness confounds attempts to document nonprofit inefficiency among nonprofits. “To state conclusively that for-profit hospitals are more efficient, it is necessary to hold...input prices and scale, constant. Even if one could successfully do this, it would be difficult to distinguish whether cost differentials were due to slack or quality” (Sloan, 2000, p. 1155).

II. IDENTIFICATION

We bypass the need to measure quality and patient severity of illness by examining the pattern of sales prices of nonprofit and for-profit hospitals. Different types of inefficiency generate different theoretical predictions about the relative sales prices. The predictions depend both on the relative efficiency of nonprofits as well as whether the market for hospitals is efficient (competitive). We consider four competing scenarios: (a) inefficient markets and technically inefficient nonprofits, (b) efficient markets and technically inefficient nonprofits, (c) efficient markets and allocatively inefficient nonprofits, and (d) efficient markets and efficient nonprofits. The four sets of predictions discussed below are summarized in Table 1.

⁴ See Sloan (2000) for a review of this literature.

a. Inefficient Markets and Technically Inefficient Nonprofits

The scenario in which the market for hospitals is not competitive and nonprofits are technically inefficient is one that worries policy makers; nonprofits might sell to for-profits at “too low” a price. In this case, the lack of competition means that there are few potential buyers and nonprofits lack the inability to recognize and reject low bids. In this case, a for-profit could take advantage of the inefficient nonprofit. However, in a competitive market for hospitals, even if nonprofits are inefficient, competition bids up the price of a nonprofit hospital to its “market” value.

While in inefficient markets and technical inefficiency implies that nonprofits sell too low, it also implies that nonprofit buyers may pay too much when buying for-profits. This prediction is similar to the hypotheses of earlier cost studies, which predict higher costs for technically inefficient nonprofits.

b. Efficient Markets and Technically Inefficient Nonprofits

With efficient and competitive markets, competing bidders would drive up the sales price of the hospital to its market level. If a nonprofit is technically inefficient, a for-profit buyer would expect to be able to install efficient incentives and management that would improve profitability above the nonprofit’s current performance.⁵ Therefore, it would be willing to pay a premium for an inefficient nonprofit over an equivalent for-profit with identical risk-adjusted cash flow. This premium would equal the difference between the value of the firm under inefficient management and the value of the firm

⁵ Note that our hypotheses that inefficient hospitals will sell at a premium to efficient for-profits stem from the change in ownership (governance structure) and management incentives. When changes in governance structure and incentives are not involved, more efficient firms would sell for more than less efficient firms (Gompers, Ishii, Metrick, 2001).

under efficient management⁶. However, as in the first scenario technically inefficient nonprofits buyers would pay more for a similar for-profit hospital.

c. Efficient Markets and Allocatively Inefficient Nonprofits

If markets are efficient, and hospitals are on the efficient frontier but allocatively inefficient, then we would again expect for-profits buyers to pay a premium. In this case, the efficient for-profit can improve the nonprofit's financial performance by reallocating production among its different product quantities and qualities. In fact, Sloan's (2001) finding that complications increase after a hospital converts, suggests that for-profit management might reduce the quality of care after buying a nonprofit hospital.

Because allocatively inefficient nonprofits are hypothesized to be managerially efficient (i.e., technically efficient), allocatively inefficient nonprofits would behave efficiently as buyers; as cost-minimizers, allocatively inefficient nonprofits would not overpay for acquisitions. An allocatively inefficient nonprofit buyer would pay no more for a for-profit hospital than an efficient for-profit would pay.

d. Efficient Markets and Efficient Nonprofits

Finally, if markets and nonprofits are efficient, we predict that for-profits will pay neither discount nor premium for nonprofits. Similarly, nonprofits would pay no more than for-profits as buyers.

⁶ Kaplan (1989) finds that buyers in management buyouts pay a premium to shareholders to take a company private because they intend to institute more efficient managerial incentives.

III. Methods

The market value of a firm is a function of its assets,

$$V = V(A_1, A_2, A_3 \dots) \quad (1)$$

If the market for the firm's assets is competitive and the value function in (1) is homogenous of degree one, then the market value is a linear function of the book value of the assets:

$$V = qA, \quad (2)$$

where the multiplier is Tobin's q (Hayashi 1982). Tobin's q is a function of risk adjusted expected future earnings.

To get an estimable specification, we take the log of equation (2) to get

$$\ln(V) = \ln(q) + \ln(A) . \quad (3)$$

Then, since we don't know the firm's risk adjusted future earnings, we specify the log of Tobin's q to be a function of the current financial performance of the firm:

$$\ln(q) = \beta_0 + \beta_1 \left(\frac{E}{A} \right) + \beta_2 \dot{E} + \beta_3 \left(\frac{D}{A} \right) + \varepsilon \quad (4)$$

where E is this period's earnings, \dot{E} is the recent growth in earnings, and D is the firm's level of debt. We obtain our estimating equation by substituting equation (4) into (3):

$$\ln(V) = \gamma \ln(A) + \beta_0 + \beta_1 \left(\frac{E}{A} \right) + \beta_2 \dot{E} + \beta_3 \left(\frac{D}{A} \right) + \varepsilon . \quad (5)$$

We first estimate equation (5) and test to see if γ is equal to one as hypothesized in (3). This is a test of whether the market for hospitals is competitive. If the data pass this test, then we can estimate a modified version of (4):

$$\ln(q) = \beta_0 + \beta_1 \left(\frac{E}{A} \right) + \beta_2 \dot{E} + \beta_3 \left(\frac{D}{A} \right) + \sum_j \sum_k \phi_{jk} B_j S_k + \varepsilon, \quad (6)$$

where $q = V / A$, B_j is the buyer's ownership type and S_k is the seller's ownership type.

We estimate models (5) and (6) using data on financial information and sales prices on 135 hospital sales transactions throughout the United States over the period 1990 – 2000. While these data are public, they are difficult to compile. We obtained them from a hospital industry investment bank, which compiled the data for its own internal use. Table 2 provides descriptive statistics for the variables used in the analysis for the sample as a whole and for each of the combination of buyer and seller types.

V. RESULTS

a. Is The Market For Hospitals Competitive?

The basic estimation results are reported in Table 3. The first 3 columns report the results for the market value equation specified in (5). The dependent variable is the log of the sales price of the hospital measured as cash transferred less debt assumed. In the case where a for-profit acquires a nonprofit none of the debt can be assumed by the acquirer and must retired before ownership is transferred. We estimate 3 different versions of this model all of which condition on log(assets) and current earnings rate measured by earnings before interest, taxes, interest, debt and amortization (EBITDA) divided by assets. We add the debt to assets ratio in model 2 to adjust for risk, and the growth rate in earnings in model 3.

In all three specifications, the coefficient on log(assets) is almost exactly equal to one and definitely not significantly different from one. This satisfies Hayashi's (1982) condition for the market for hospitals to be competitive and efficient. Therefore, we can rule out scenario one where the market for hospitals is not competitive and hospitals are

technically inefficient, implying that nonprofits are not sold to for-profits at “too-low” a price. As a robustness check we will also verify that nonprofits are not being sold to for-profits at lower price than a similar performing for-profit in models that include the buyer and seller ownership types in the next section. This allows us to estimate Tobin’s q , as measured by sales price divided by assets, as a dependent variable.

The results, reported in the last three columns of the Table 3, confirm the findings in the first three columns, that neither debt nor earnings growth rate add much to the model. Therefore, we will add the buyer and seller types to the specification in model 1 to test the hypotheses concerning nonprofit efficiency.

b. Are Nonprofit and Government Hospitals Efficient?

The estimation results for equation (5) are presented in Table 4. The dependent variables are Tobin’s q measured by sales price divided by assets. The regressors in all three specifications include earnings divided by assets and dummy variables indicating the ownership types of the buyer and seller. In all cases the omitted comparison type is a for-profit buyer and for-profit seller.

The first column reports the results for a basic specification. The coefficient on for-profit buyers of nonprofits and for-profits buying government hospitals is not significantly different from zero. This implies that there is no significant difference in the sales price when a for-profit buys a nonprofit or government hospitals and when a for-profit buys a for-profit.

These results have two important implications. First, they imply that markets are efficient and therefore reject the hypothesis that nonprofit hospitals are sold for “too low”

a price. The efficiency of markets strikes us as reasonable because we know anecdotally that nonprofit managers have access to the same investment banking expertise that for-profit managers have.⁷ Our findings are consistent with Sloan et al's (2000) case studies. Moreover, even in Goddeeris and Weisbrod's (1999) example of a nonprofit conversion that narrowly escaped under-pricing, "a bidding war for the HMO ensued." Second, these results suggest that the market for corporate control views both nonprofit and government hospitals as technically and allocatively efficient as for-profit hospitals.

Finally, the results in column one of Table 4 also show that the coefficient on the nonprofit buyer of a for-profit hospital is not significantly different from zero. This implies that that a nonprofit buyer pays the same for a nonprofit as does a for-profit buyer. This is consistent with the earlier result that suggests that the market for hospitals is competitive and that nonprofits behave efficiently as buyers.

c. Do Nonprofit Buyers of Nonprofits Get Discounts?

An interesting result in the first model in Table 4 is that nonprofit buyers of nonprofit hospitals pay significantly less than for the purchase of a similarly performing for-profit hospital. Nonprofit buyers are given a 43 percent discount. Similarly, the results also suggest that nonprofit may be able to purchase government hospitals at a 29 percent discount, although this estimate is not significantly different from zero. However, it is significantly different from zero at the 10 percent level in a model where the coefficients on for-profit buyers are restricted to be zero (model 2).

⁷ This access to investment banking expertise might have been expected based on anecdotal evidence. Without it, nonprofits would accept bad offers; but we know from Sloan et al's case studies that several nonprofits rejected for-profit offers.

If nonprofits are efficient, how do we account for the findings that nonprofits and government hospitals sell at a discount to nonprofit buyers? Nonprofit hospitals have long been regarded as mission oriented. Indeed, when a nonprofit hospital is sold the proceeds are used to set up public trusts in order to carry on serving that mission. One possibility is that nonprofits and government sellers offer discounts to buyers that they believe are more likely to continue non-contractible mission objectives such as not performing abortions, keeping an emergency room open, or treating indigent patients. Indeed, there is anecdotal evidence that nonprofits choose nonprofit buyers over for-profit buyers in part because of mission congruence.⁸

To examine this more closely, we further categorize our transactions according to whether a nonprofit is religious or non-religious. Cutler and Horwitz (2000) have emphasized the importance of religious affiliation in hospital conversions. One would expect religious non-profits to give other religious nonprofits a discount, but not give a discount to non-religious nonprofits.

In Model 3 in Table 4 nonprofits are separated into religious nonprofits and non-religious nonprofits, both as buyers and as sellers. Because the sample sizes are small for some of categorizations, we interpret the results cautiously. However, religious nonprofits appear to receive a discount from both religious and non-religious sellers, while non-religious nonprofits get a discount from other non-religious nonprofits. Religious nonprofits appear to be unwilling to give non-religious nonprofits a discount. These models estimate the magnitude of discount to be about 48 percent.

⁸ For example, in 1995, nonprofit Venice Hospital in Florida was sold to nonprofit Bon Secours Health System. Venice had rejected a bid (undisclosed) from for-profit Columbia/HCA Healthcare Corporation because, according to Venice president and CEO, Jack Norman, “The board liked Bon Secours’ culture, charitable mission, financial depth and management team” (Greene, 1995).

While these results are consistent with the hypothesis that nonprofit and government seller give discounts to nonprofits that they believe will carry on their mission, it is possible that these hospitals are so bad off that there they could no be sold as a going concern. Are nonprofits buying bad hospitals? Is there some important difference between nonprofits that sell to for-profits and nonprofits that sell to nonprofits? For example, hospitals with dilapidated physical plant located in inner cities. In this case, no profit-oriented organization would ever think of taking it over, implying that only a nonprofit would by it at a steep discount.

To test this hypothesis, we compare the mean financial performance of nonprofit hospitals selling to for-profit buyers to the mean performance of nonprofits selling to nonprofit buyers in the first panel in Table 5. We find no difference in assets, profits or debt. Similarly, we find no differences between the financial performance of government hospitals that sell to for-profit buyers and government hospitals that sell to nonprofit buyers.

VIII. Discussion and Conclusion

Our comparison of sales prices of nonprofit hospitals with sales prices of for-profit hospitals has several implications. First, if nonprofit hospitals are being sold at “too low” a price, as popular accounts often assert, a valuable mission could be at stake. The proceeds from nonprofit hospital sales are entrusted to a public administrator to pursue the original nonprofit hospital’s mission. A low price means a short-changing of this mission. We find no evidence that nonprofits are sold for less than for-profits, especially when selling to for-profits.

There is evidence, however, that nonprofits sell at a discount to like-minded nonprofits that may share a social mission. This discount could be interpreted as the value of the nonprofit's mission, or "incentive alignment". If markets are competitive, as the statistical and anecdotal evidence suggests, a seller is usually confronted with a variety of buyers, nonprofit and for-profit. The nonprofit seller either chooses a low bid from a same-mission nonprofit or a higher bid from a for-profit.

From a theoretical standpoint, we argue that if nonprofits were inefficient firms, poorly managed and without clear ownership, nonprofits would sell at a higher price than for-profits with the same risk-adjusted cash flows. Nonprofits would also pay more than for-profits when buying hospitals. We find no evidence that nonprofits sell at a premium for hospitals. This suggests that nonprofits are as technically efficient as for-profit hospitals with strong managerial incentives and access to expertise.

VIII. References

Barberis, Nicholas, Maxim Boycko, Andrei Shleifer, and Natalia Tsukanova, "How Does Privatization Work? Evidence from the Russian Shops," *Journal of Political Economy*, 104: 4, 764-790.

Cutler, David M. (2000) "Introduction" in *The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions*, ed. David M. Cutler.

----- and Jill R. Horwitz, (2000) "Converting Hospitals from Not-for-Profit to For-Profit Status: Why and What Effects?" in *The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions*, ed. David M. Cutler.

Frank, Richard G. and David S. Salkever, (1991) "The supply of charity services by nonprofit hospitals: motives and market structure," *RAND Journal of Economics*, 22 (3): 430-45.

Glaeser, Edward L., (2001) "The Governance of Not-For-Profit Firms," Harvard Institute for Economic Research Working Paper 1954.

Goddeeris, John H. and Burton A. Weisbrod, (1999) "Why Not For-Profit? Conversions and Public Policy," in *Nonprofits and Government: Collaboration and Conflict*, ed. Elizabeth T. Boris and C. Eugene Steuerl, The Urban Institute.

Gompers, Paul A., Joy L. Ishii and Andrew Metrick, (2001) "Corporate Governance and Equity Prices," working paper.

Hall, Bronwyn H., (2000) "Innovation and Market Value," in Barrell, Ray, Geoffrey Mason, and Mary O'Mahoney (eds.), Productivity, Innovation and Economic Performance, Cambridge: Cambridge University Press.

Hansmann, Henry, (1998) The Ownership of Enterprise. Harvard University Press.

Hayashi, Fumio, (1982), "Tobin's Marginal q and Average q: A Neoclassical Interpretation," *Econometrica*, 50(1), 213-224.

Kaplan, Steven, (1989) "The Effects of Management Buyouts on Operating Performance and Value," *Journal of Financial Economics*, 24, 217-254.

Kuan, Jennifer, (2001a) "The Phantom Profits of the Opera: Nonprofit Ownership in the Arts as a Make-Buy Decision," *Journal of Law, Economics, and Organization*, 17(2).

--- (2001b) "Open Source Software As Consumer Integration Into Production," unpublished, UC Berkeley.

La Porta, Rafael and Florencio Lopez-de-Silanes (1999), "The Benefits of Privatization: Evidence from Mexico," *Quarterly Journal of Economics*, 114: 4, 1193-1242.

Lakdawalla, Darius and Tomas Philipson, (1998) "Nonprofit Production and Competition." Unpublished, University of Chicago.

Lutz, Sandy, (1996) "How Much? Price is Becoming a Contentious Issue in Sales of Not-For-Profit Hospitals, as Communities Seek Fair Value and Challenge Secrecy," *Modern Healthcare*, February 12, 1996, p. 85.

Meggison, William L., Robert C. Nash, Matthias Van Randenborgh, "The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis," *Journal of Finance*, 49: 2, 403-254.

Morck, Randall. Andrei Shleifer and Robert W. Vishny, (1988), "Management Ownership and Market Valuation: An Empirical Analysis," *Journal of Financial Economics*, 20, 293-315.

Newhouse, Joseph P. (1970), "Towards a Theory of Nonprofit Institutions: An Economic Model of a Hospital," *AER* 60, 64-74.

Norton, Edward C. and Douglas O. Staiger, (1994) "How hospital ownership affects access to care for the uninsured," *RAND Journal of Economics* 25 (1): 171 – 85.

Pauly, M. and M. Redisch (1973), "The Not-for-Profit Hospital as a Physicians' Cooperative," *AER* 63, 87-99.

Shleifer, Andre (1998), "State versus Private Ownership," *Journal of Economic Perspectives*, Vol 12, No. 4, pp. 133-150.

---, and Robert W. Vishny (1994), "Politicians and Firms," *Quarterly Journal of Economics*, 109: 4, 995-1025.

Sloan, Frank A., (2000) "Not-For-Profit Ownership and Hospital Behavior," in *Handbook of Health Economics*, vol. 1, ed A.J. Culyer and J.P. Newhouse, Elsevier Science.

---, (2001) "Hospital Ownership Conversions: Defining the Appropriate Public Oversight Role", NBER Working Paper.

---, Donald H. Taylor, Jr. and Christopher J. Conover, (2000) "Hospital Conversions: is the Purchase Price Too Low?" in *The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions*, ed. David M. Cutler.

Smith, Dean G., Jan P. Clement, and John R. C. Wheeler, (1995) "Philanthropy and Hospital Financing," *Health Services Research* 30 (5): 615 – 635.

Steinberg, Richard, (1986) "The Revealed Objective Functions of Nonprofit Firms," RAND Journal of Economics 16(4): 508 - 26.

Thorpe, Kenneth E. and Charles E. Phelps, (1991) "The Social Role of Not-for-profit Organizations: Hospital Provision of Charity Care," Economic Inquiry 29 (2): 472-84.

Table 1: Sales Price Predictions Relative to a For-Profit Buying Another For-Profit

Market For Hospitals is Competitive	Nonprofit Hospital is		Sale Price¹	
	Technically Efficient	Allocatively Efficient	For-Profit Buying Nonprofit	Nonprofit Buying For-profit
No	No	No	Lower	Higher
Yes	No	No	Higher	Higher
Yes	Yes	No	Higher	Equal
Yes	Yes	Yes	Equal	Equal

¹Compared to For-profits Buying For-profits

Table 2: Means and Standard Deviations

Variable	All	Nonprofit Buyer (N=47)			For-Profit Buyer (N=85)		
		For-Profit Seller	Nonprofit Seller	Government Seller	For-Profit Seller	Nonprofit Seller	Government Seller
Sales Price (Cash Transferred Less Debt Assumed) ¹	72.4 (211.2)	71.1 (77.0)	47.6 (40.5)	43.6 (42.8)	174.9 (541.5)	60.8 (58.0)	39.1 (42.1)
Assets ¹	79.3 (166.3)	55.5 (27.9)	82.2 (63.6)	53.7 (35.8)	137.2 (418.3)	76.1 (66.8)	45.5 (52.8)
EBITDA ¹ = Earnings Before Interest Taxes Depreciation and Amortization	9.0 (24.9)	4.1 (9.1)	7.7 (6.7)	5.1 (5.6)	18.4 (63.1)	8.9 (8.7)	6.0 (8.6)
EBITDA Growth Rate (Last 2 Years)	0.1 (2.4)	-0.5 (1.1)	-0.1 (0.8)	0.1 (0.8)	0.4 (1.8)	0.2 (3.4)	0.6 (2.5)
Debt ¹	34.8 (88.9)	25.1 (26.3)	32.2 (29.6)	18.6 (20.9)	69.9 (224.9)	35.1 (32.1)	9.1 (13.2)
Number of Observations	135	13	24	11	19	53	15

Notes: ¹The values for these variables are reported in millions of dollars. The number of for-profit sellers is 32, number of non-profit sellers is 77, and the number of government sellers is 26.

Table 3: Basic Sales Price and Tobin's Q Regression Results

Independent Variable	ln (Sales Price)			ln (Sales Price / Assets)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Log (Assets)	0.989*** (0.049)	0.986*** (0.049)	0.956*** (0.054)			
EBITDA/Assets	2.371*** (0.509)	2.241*** (0.515)	2.559*** (0.620)	2.368*** (0.507)	2.238*** (0.513)	2.516*** (0.617)
Debt/Assets		-0.210 (0.143)	-0.250 (0.170)		-0.209* (0.142)	-0.243 (0.170)
EBITDA Growth Rate			0.029 (0.024)			0.029 (0.024)
F-Statistic for year fixed effects	2.91***	2.87***	2.79***	3.06***	3.04***	2.83***
R-Squared	0.79	0.79	0.79	0.28	0.29	0.30
Number of Observations	135	135	115	135	135	115

Notes: Each column reports the estimated coefficients and standard errors from a separate regression where the dependent variable is the log of the sales price. In addition to the independent variables reported in the table, year dummy variables were included in all of the models. The symbol * indicates that the estimated coefficient is significantly different from zero at the 10 percent level, ** indicates that is significant at the 5 percent level, and *** indicates significance at the 1 percent level.

Table 4: Buyer-Seller Type Regression Results (Dependent Variable = Tobin's Q)

Independent Variable		Model 1	Model 2	Model 2
EBITDA/Assets		2.414*** (0.500)	2.151*** (0.475)	2.075*** (0.475)
<u>Buyer Type</u>	<u>Seller Type</u>			
For-profit	Nonprofit	-0.078 (0.164)		
For-profit	Government	-0.147 (0.189)		
Nonprofit	For-Profit	0.022 (0.201)		
Nonprofit	Nonprofit	-0.565*** (0.186)	-0.551*** (0.128)	
Nonprofit	Government	-0.344 (0.223)	-0.339* (0.178)	-0.354** (0.178)
Religious NP	Religious NP			-0.668*** (0.278)
Nonreligious NP	Religious NP			0.023 (0.293)
Religious NP	Nonreligious NP			-0.637*** (0.242)
Nonreligious NP	Nonreligious NP			-0.690*** (0.191)
F-Stat. for year fixed effects		2.95***	3.79***	3.18***
R-Squared		0.40	0.39	0.43
Number of Observations		135	135	134

Notes: Each column reports the estimated coefficients and standard errors from a separate regression where the dependent variable is the log of Tobin's q measured as the sales price divided by assets. The omitted category in model 1 is for-profit buyer and for-profit seller. In addition to the independent variables reported in the table, year dummy variables were included in all of the models. The symbol * indicates that the estimated coefficient is significantly different from zero at the 10 percent level, ** indicates that is significant at the 5 percent level, and *** indicates significance at the 1 percent level.

Robustness: The results in table 4 do not change appreciably when Debt/Assets is added to the model. This variable is not significantly different from zero in each of the models. The results also do not change when interactions between EBITA/Assets and a non-profit seller dummy and EBITDA/Assets and a government dummy are added to the model. These variables are individually and jointly not significant in all the models. The results of these robustness analyses are available from the authors upon request.

Table 5: Non-Profit and Government Seller Means

		Ln(Assets)	EBITDA/Assets	Debt/Assets
<i>Non-Profit Seller</i>				
For-Profit Buyer	Mean	4.01	0.10	0.33
Nonprofit Buyer	Mean	3.93	0.12	0.47
	Difference (T-Statistic)	0.08 (0.34)	-0.02 (1.12)	-0.14 (0.67)
<i>Government Seller</i>				
For-Profit Buyer	Mean	3.82	0.09	0.26
Nonprofit Buyer	Mean	3.20	0.10	0.26
	Difference (T-Statistic)	0.62 (1.39)	-0.01 (0.50)	0 (0.00)